

# Victoria's Wisdom

## CHAGA

### POTENTIAL ANTI-TUMOUR TREATMENT?

Inontus obliques is a fungus that grows on birch trees in Northern Canada.

Known in Russia by the popular name 'Chaga' or 'Tchaga', I. Obliques has been used in folk medicine since the sixteenth century as a remedy against cancer and diseases of the digestive system. For generations Chaga had been thought of as mysterious and magical, but in recent years this perception has changed with the scientific literature in Russia focusing on the medicinal properties. The fungus and its preparations were sold as a liquid extract under the name 'Befungin' and was approved by the Russian Medical Research Council in 1955 following clinical investigation.

### WHAT IS CHAGA?

Chaga is known as Inontus obliques - it was formerly called Polyporus obliques. Common names include Birch Mushroom, Birch Canker, Chaga and Clinker.

Inontus obliques is a flack parasitic fungus produced on the living trunks of mature birch [Betula]. The black, deeply scarred and cracked appearance of the outer surface of the protruding growth resembles burnt charcoal which suggested 'clinker' as one of its common names. This wood rotting fungus has long been used as a folk medicine in several East European countries and Russia. The portion of the fungus traditionally used is the inner brown layer growing closest to the tree. The folk uses of Chaga addressed many complaints such as gastritis, ulcers, TB of the bones, as well as cancer. IN the last several years, medical research and laboratory tests of the efficacy of the fungus as an anti-tumour agent have confirmed some of the early claims.

### NORTH AMERICAN NATIVE USE

The Woodland Cree of Canada names this fungus either 'Pos kan' or 'W sakechak omik h'. The latter name, W sakechak's scab for the conk of I. obliques is derived from the following legend. "W sakechak threw a scab [which he had mistaken for dried meat and tried to eat] against a tree where it has stayed to this day to benefit mankind."

The Cree used the soft orange part of the conk as tinder or touchwood for the building of campfires. One fire starting method commonly used by the Cree was the striking of steel against a piece of flint to make sparks. The sparks would ignite a piece of dry pos kan [which catches easily and remains smoldering] and then the pos kan is used to ignite thin pieces of birch bark and small dry twigs in turn.

Other uses of the fungus by the Cree were to place small pieces in the bowl of a pipe to keep the tobacco burning, as the tobacco had a tendency to go out when moist. When tea was scarce it was used as a substitute and was said to be sweet in taste. Another interesting use was as a counter irritant for arthritis, a matchstick shaped piece of the conk was placed on the skin over the painful area and burned.

Chaga is interesting botanically. The body is an irregular black mass up to 12 by 6 inches, black, deeply cracked throughout, hard and brittle. The flesh is orange brown in colour. The fresh, sterile conks, which can be harvested or collected throughout the year, are cut into slices and gently dried at room temperature, or between 50 - 60 degrees Celsius, and stored in a dry place until required. The sterile conks, inside three layers are the parts that are used. It has an anti-tumour action, is a tonic, alternative, stomachic and anodyne.

Although an early study of an aqueous extract of *I. obliquus* reported anti-tumour activity, the authors did not specify which components were responsible for the activity. The fungus has been found to be rich in the related triterpenes, lanosterol and inotodiol as well as betulin and some sterols. Tests of these compounds, as to their anti-tumour properties, indicated that inotodiol was the most active compound that was able to destroy 100% of Walker 256 Carcinosarcoma cells and MCF-7 human adenocarcinoma mammary cells.

Further testing of compounds isolated from *I. obliquus* demonstrated that several others also exhibited strong cytotoxicity towards carcinoma cells in vitro. Lanosterol was found to be fully inactive against the Walker 256 cell line, but was able to kill 90% of MCF-7 cell line at the highest cell concentration used in this study. A triterpene fraction which consisted of a mixture of four compounds was found to be 100% effective against the MCF-7 cell line. Contrary to earlier published reports betulin was found inactive towards the above two cell lines.

The dried shredded inner part of the conk is softened by soaking in cold, but previously boiled water for 4 hours which is filtered and liquid portion saved as well as the softened fungus. An infusion is prepared by pouring sterilized boiling water, cooled to 50 degrees Celsius, over the fungus [use a weight ratio of 1:5, fungus to water]. This is left to stand at room temperature for 48 hours. The mixture is then filtered and the water in which the fungus was originally soaked is added to the filtrate. It is important never to over heat the fungus and to treat it as you would yeast, never subjecting it to too much heat or cold. The triterpenes, lanosterol and inotodiol give the extract its anti-tumour activity.

The infusion can be used for up to 4 days. Three glasses should be taken per 24 hour period, approximately 30 minutes before meals. It takes some 7 kg a month of fungus for a course of treatment, lasting 4 - 7 months, with short breaks if necessary.

The fungus is most frequently encountered in the sterile condition on living trunks of mature birch trees. The conks, acting like a wedge, burst through the bark and appear as large gall-like structures, varying in size from 5 - 20 cm in diameter, with a very irregular, cracked and deeply fissured surface. The structure forces the bark apart, keeping the wound open and allowing the fungus to enter the unaffected wood. The conks have a hard, woody to almost stony texture. When removed from the tree the internal surface is rusty brown, somewhat granular in appearance and is often mottled with whitish or cream coloured veins. The sterile structures are formed of densely compacted and entwined hyphae making this hyphal structure difficult to characterize.

The fungus fruits on the dead standing or fallen trunk possibly as long as 6 years after the tree has died. The inconspicuous and short-lived fruiting bodies form under the bark extending for several meters over the wood. At intervals broad columns of hyphae grow out horizontally for up to 2 cm, with pores being produced on their underside. Seen from above the surface is golden brown with a satiny sheen.

Various therapeutic claims have been made. According to Reid [1976], Chaga relieves pain and improves a patient's condition by reducing sickness and heartburn. Taken in the early stages of the disease, it can halt the growth of tumours and is said to be especially effective against those of the stomach and lungs.

The fungus is apparently non-toxic and has no side effects. Some sources indicate that while a patient is receiving treatment of the kind, intravenous applications of glucose and penicillin-3 should be discontinued. It is also recommended that the patient's diet should consist mainly of mild vegetables with limited meats and fats; smoked products and strong spices should be avoided.

Chaga is also said to be beneficial in cases of chronic gastritis and has been used for all stomach complaints including ulcers. It may also be effective for cancer, TB of the bones, and glandular organs where operations are not possible due t the network of blood vessels.

Recent investigations of a closely related species *I. radiatus* have shown that constituents extracted from this fungus also display significant anti-tumour activity. It is said that the wood rotting fungus *I. radiatus* commonly occurs in Finland on the trunks of birch and alder trees. The n-hexane fraction extracted from the sporophores of the fungus collected from living trunks of alder, yielded pure lupenone and ergosterol peroxide as well as a mixture of other sterols. Anti-tumour activity of several of these compounds, as well as the water extract and alcohol extract, were studied using standard techniques.

The water extract of the fungus proved to be either inactive or only slightly active against the two cell lines tested [Walker 256 and MCF-7] whereas the constituents soluble in ethanol and n-hexane were moderately active killing up to 50% of the cells after five days. From the results of other investigations, some concluded that the activity of the n-hexane fraction could be attributed to derivatives of ergosterol. Ergosterol peroxide was active against both cell lines, not only inhibiting growth but also killing them 100%. At the time of writing, the active constituents of the water and alcohol extracts were unidentified.

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